

nature

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After geodynamics, what?

THE earth sciences depend very largely on international collaboration, so it is no surprise that there has been a succession of projects aimed at nurturing the free flow of data and ideas across national boundaries. International Polar Years, and the International Geophysical Year of 1957 led in the 1960s to the Upper Mantle Project and in the 1970s to the Geodynamics Project, which closes at the end of this year. Questions are inevitably being asked now about a possible successor to these programmes, and in Zurich last week, under the aegis of the International Union of Geological Sciences (IUGS), a wide variety of earth scientists gathered to review the state of their specialisations and to mull over a proposal for collaboration in the 1980s.

What does a low-budget international scientific programme achieve? In some respects very little. It offers no research funds. Most scientists in their national context are unlikely ever to read the rationale behind projects and even less are they likely to make a major adjustment in their research to take account of the projects stated aims. And in many, though not all, countries the availability of funds for the support of research is likely to be tied much more closely to the excellence of the investigator or the relevance of the proposed work to national needs than it is to the context of an international programme. Many of the remarkable discoveries in the earth sciences of the past twenty years have been made with little or no direct assistance from the prevailing project of the time. On the other hand, international projects can concentrate on two aspects of science which national systems are often not competent to assist—indeed sometimes seem positively to hinder: the bringing together of people from a wide variety of national and multi-disciplinary backgrounds, and the removal of blockages in making data easily accessible regardless of its national origin. On this basis alone the modest costs of a small secretariat, travel funds and data centres seem amply justified. Since all branches of science at all times profit greatly from this sort of assistance it is unfortunate that international unions have to convene working groups, write long reports and propose grandiose projects simply to maintain the rudiments of international and interdisciplinary scientific exchange.

Be that as it may, with the Geodynamics Project running out in ten months' time there is a pressing need for a new programme to be announced. Four years ago it seemed possible that the International Union of Geodesy and Geophysics (IUGG) might opt completely out of a further inter-union programme (the totally illogical way in which the geologists and geophysicists have separate unions and entirely different organisational machinery within them surely represents one interdisciplinary blockage which ICSU could do well to eliminate). In the past year and a half, however, IUGG has buried the hatchet and working groups convened by Dr H. Illies of Hamburg (IUGS) and Dr C. Kisslinger (IUGG) have now brought forward a joint proposal for the next ten years. But even if the respective

unions in their different ways accept the present document, it will not be until the summer of 1980 that final approval can be obtained from ICSU's general assembly, so there is bound to be a hiatus between one project and the next.

It is possible to identify three distinct threads of argument in discussions of this document. The first recognises that scientific advance is to a degree independent of international projects so simply reckons that the next ten years will build on what has already been learnt, though will doubtless contain some surprises—will in effect be a continuation of the International Geodynamics Project. The second believes that to be politically acceptable it will not be possible simply to say 'more of the same'—a new title will be necessary and new foci of attention will be called for. The Illies-Kissinger document carefully pulls together these two threads; the central theme of the proposed new programme would be 'the current state, dynamics, origin and evolution of the lithosphere, with special attention to the continental lithosphere'. (The lithosphere is the strong outermost shell of the Earth, of depth up to 150 kilometres beneath continents.) The programme proposes a change of focus and yet is a logical consequence of what has gone before.

The third line of thinking, however, says that earth scientists must respond to changing political climates, most notably in two areas: first, global resources, hazards and the maintenance of the environment; second, the need of the developing world for strengthened scientific and technological bases.

This geopolitical point of view has been put forward most forcefully by Professor L. Nicolaysen of the University of the Witwatersrand, Johannesburg. He recognises that the Illies-Kisslinger document does mention these matters, but would have them occupy a much more prominent position in project plans.

There are some fairly good administrative and bureaucratic reasons why this proposal can be resisted. It raises all sorts of questions that will offend countries' sensibilities, bring in new agencies, straddle difficult industry/academic frontiers, call for larger expenditure and so on. Quite so. But it is time earth scientists faced up to the uneasy barriers that exist between pure and applied research, and it is time they recognised the unique role they can play in the developing world. Maybe they should look, for a start, at the success of the International Centre for Theoretical Physics at Trieste in nurturing developing world scientists, and should wonder whether the earth scientists might evolve a similar project.

It would be a mistake simply to avoid these issues as being too political or too complex. The unions, whilst accepting the present document as a sound basis on which to proceed scientifically, should grasp the opportunity they have to bring together a highly fragmented range of disciplines, to take greater steps to bring basic and applied science together and to start serious thinking about responsibilities in the developing world. □